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**The therapeutic effect of physical activity
in a day-hospital patient with anorexia nervosa**

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Introduction

Many presentations of anorexia nervosa (AN) are characterised by frequent engagement in excessive physical exercise (PE) (Zunker, Mitchell & Wonderlich, 2011). Therefore, the treatment of AN includes the restriction of PE, and in some severe cases individuals are prescribed bed rest (Moola, Gairdner & Amara, 2015). Clinical observation has highlighted that advice to completely refrain from physical activity often drives the compulsion to exercise secretly, serving only to reinforce the isolative and shameful experience of an eating disorder (ED). Likewise, clinicians can feel frustrated that advice to refrain from PE is not taken (Beumont, Arthur, Russell & Touyz, 1994).

The majority of patients with AN experience loss of muscle mass (El Ghoch et al., 2017). For this reason, resistance training seems sensible to prevent muscle atrophy (Fernández-del-Valle, Larumbe-Zabala, Morande-Lavin, & Perez Ruiz, 2016). Additionally, PE has been shown to promote bone health (Santos, Elliott-Sale & Sale, 2017) which is beneficial as AN is typically associated with low bone mass, impaired bone structure, and reduced bone strength; all of which contribute to increased fracture risk (Misra & Klibanski, 2014).

Alongside the physical health benefits, PE can help improve mood, quality of life and wellbeing (Moola, Gairdner & Amara, 2015).

However, the research into PE in the treatment of AN is limited and there are no standardised guidelines (Zunker, Mitchell & Wonderlich, 2011) despite considerable efforts on an international level (BSOE, 2018). During such efforts, e.g. the Erasmus Plus project “Brighter Side of Exercise” (BSOE, 2018) it has been repeatedly noticed that fitness trainers are often uncertain about the appropriateness of specific exercises for patients with AN.

Case

This case report describes a female patient in her mid-30s who suffers from AN according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013). She first presented with mild eating difficulties during her adolescence but only received help once in her 20s from a dietician and counsellor as part of the Student Health Services. Following this treatment, she was able to manage without ED services for 10 years, but her ED behaviours began to re-develop following a miscarriage and significant stress at work. Before admission, she experienced significant weight loss while eating only 400 calories per day.

Considerable occupational disruption and imbalance was a key feature with daily life being dominated by a pattern of over-exercising and restriction of food. This over-activity was identified as a measure to cope emotionally, with her using activity to create an “artificial schedule” that enabled her to experience a sense of being efficient. As a result, time use and patterns of activity excluded restoration, leisure and social connectedness with others.

Multi-disciplinary focused intervention

The patient was referred to the South London and Maudsley (SLaM) ED Service by her general practitioner at a weight of 35 kg (BMI: 15 kg/m²). Following this referral, she began with the “Step-Up” programme at Bethlem Royal Hospital (BRH) which uses a client-centred approach to support individuals with EDs to work towards recovery. It offers occupational therapy (OT), nursing, dietetic, psychological and psychiatric support in the form of group work, individual sessions and outreach community work. Patients work collaboratively with staff towards achieving goals that they set to improve their quality of life.

Physical exercise intervention

For this patient, a particular goal was to incorporate healthy exercise into her life and to build confidence in her body. The PE team at BRH created a client-owned programme which involved education on the principles of training and components of fitness. It had an emphasis on resistance training to increase muscle mass. The programme was balanced for antagonistic muscle groups, which involved a mixture of single muscle or muscle group uniplanar exercise, and more compound movements and functional exercise. It was emphasised that exercise is not a chore but should be built around social interaction and should be meaningful.

The patient met with her instructor to discuss exercise history, interests, social support, aims and different forms of exercise and activity. She was shown around the machines and equipment, and a basic programme was devised. Emphasis was put on low-level resistance training using a cable crossover, free weights, resistance bands and bodyweight. She started with training once per week progressing to twice. During the treatment period, the instructor supported her to focus on recovery. The whole intervention lasted for six months. **Table 1** summarizes the PE treatment.

Outcome

On discharge from “Step-Up”, the patient had made significant gains in weight to 45.5kg (BMI: 18 kg/m²). The ED Examination Questionnaire (EDE-Q) score at discharge was below (Giovazolias, Tsaousis & Vallianatou, 2013) the clinical cut off of 4.

Discussion

This case report reveals that significant benefits can be made from using PE in the form of resistance training as a treatment modality within a day care ED service. The individual

discussed was able to increase her weight to a healthy BMI and improve in terms of ED psychological symptomatology.

This result is in line with previous research which suggests that strength training is beneficial for patients with AN regarding their physical and mental health (Fernández-del-Valle, Larumbe-Zabala, Morande-Lavin, & Perez Ruiz, 2016). In the past, PE has been thought of as contraindicated of weight restoration (Moola, Gairdner & Amara, 2015). However, the Step-Up team has found this to be an important part of the reported patient's recovery. It should be noted that PE alone would not be sufficient to support weight restoration and the combination of different treatment options available at Step-Up were all key factors in the successes of the individual described.

This case report, however, has its limitations as it is difficult to generalise the outcome in one case to a larger population. Therefore, future research should look into the use of PE in the treatment of AN to further our understanding of its role in recovery. Nevertheless, it provides specific information about how we planned and performed PE in a patient with AN and thus makes a concrete suggestion for an intervention which can be evaluated in a larger study sample.

Acknowledgements

We thank the patient reported in this article for agreeing to have her case published.

Conflict of interest

None to declare.

Contributors

Kathryn Hughes drafted the whole manuscript, David Woodgate contributed written information about the PE intervention for the patient, Sarah J. Halford and Mary Cowan added key features of the Step-Up programme and the patient's history, Hubertus Himmerich formatted the draft into a scientific letter. All authors discussed and amended the manuscript and gave their final approval before submission.

Table 1. Key elements of the therapeutic use of physical exercise (PE) in a day-care patient with anorexia nervosa (AN).

Integration of PE into a multimodal treatment concept consisting of:
<ul style="list-style-type: none"> • Occupational therapy • Nursing • Diet counselling • Psychological therapy • Psychiatric and medical care
Preparation of PE in AN
<ul style="list-style-type: none"> • Collection of information about the patient's history and experience around PE • Identification of individual goals for PE which are helpful for recovery • Individualised education on PE • Instructions on moderate strength training • Introduction to machines and equipment • Individualised training plan
Principles for the use of PE in AN
<ul style="list-style-type: none"> • Strength training balanced for antagonistic muscle groups • Resistance training • Training in body perception • Promotion of social interactions • Purpose of PE not related to the ED symptoms
Specific exercises using:
<ul style="list-style-type: none"> • Cable crossover • Free weights • Resistance bands • Own bodyweight

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